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## THE SUMMER BIRDS OF THE GILA VALLEY, NEW MEXICO

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### INTRODUCTION

The Gila River is a small stream that originates in the highlands of southwestern New Mexico and flows through the lowlands of that state for some 55 river miles before entering Arizona. Its passage through the usually brown lowland plains and hills is traced by verdant gallery woodland and other riparian habitats (see Figure 1), which combine with more arid types to support a diverse and interesting avifauna. This paper describes the lowland portion of this valley and its habitats, briefly summarizes biological exploration there, and places on record the summer birdlife. The species in the breeding avifauna are discussed in greater detail, including classification by habitat usage, a biogeographical analysis, and a discussion of some recent changes.

Perennial streams such as the Gila River are rare in the Southwest, and little has been published about the birdlife of such valleys *per se*. One aspect of these streams that makes them nearly unique in the region is the fact that they support woodlands dominated by trees that are both broadleaved and winter deciduous. This contrasts markedly with most Southwestern arboreal habitats, which are typically dominated by conifers and/or evergreen angiosperms. Unfortunately, the already limited extent of these riparian and associated habitats has been made even smaller as the result of man's activities, and the biota of lowland river valleys is endangered or has been destroyed in many areas. Hopefully, this report will stimulate a greater appreciation and interest in this diverse assemblage of plants and animals and perhaps will help reverse its decline.

### Acknowledgments

I wish to thank the curators who allowed me to examine and cite material under their care. In addition, I would like to thank the New Mexico Game and Fish Department, the individual landowners of the

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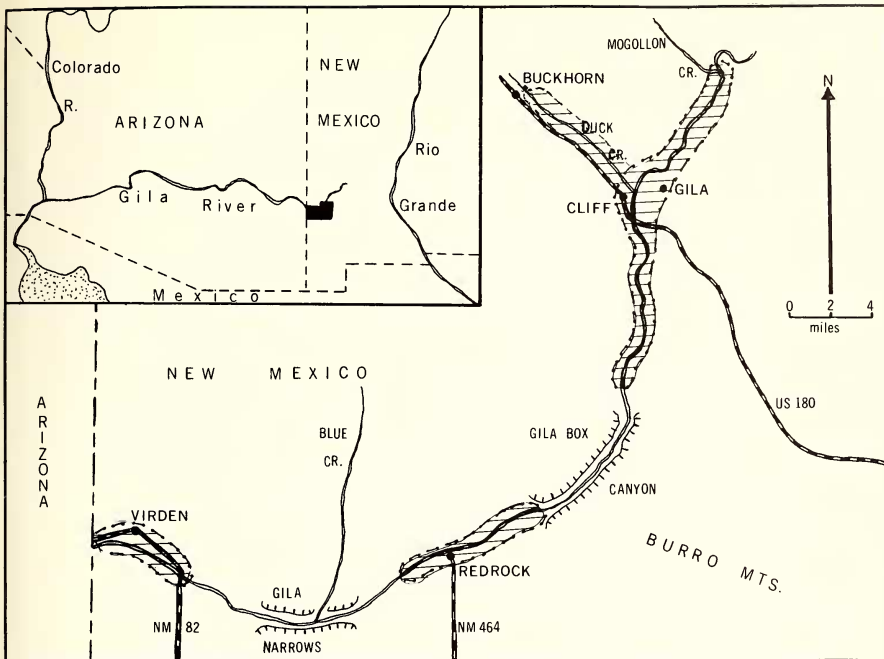
Figure 1: Aerial view of the Gila Valley, looking southward from the mouth of Mogollon Creek toward Cliff.

Gila Valley, and the following individuals, many of whom have contributed data to this study: D. Amadon, R. C. Banks, R. T. Dury, J. R. Fisher, R. A. Fisher, A. Ford, B. K. Harris, B. J. Hayward, G. Hightower, the late G. C. Hubbard, W. Huey, the D. McKnights, B. Ormond, Jr., K. F. Parker, K. C. Parkes, R. A. Paynter, A. R. Phillips, J. L. Sands, C. Tomoff, F. D. Trauber, L. L. Wolf, D. A. Zimmerman, and R. L. Zusi. I am very grateful to R. P. Balda, R. C. Banks, R. R. Johnston, G. Monson, R. J. Raitt, and H. M. Zeller for reading and commenting constructively on various drafts of this paper. The Sierra Club provided for an aerial survey of the Gila Valley in December 1967. Final thanks go to my wife Claudia.

## ORNITHOLOGICAL HISTORY

The first naturalists to describe the Gila Valley in New Mexico were Lt. Col. W. H. Emory and Capt. A. R. Johnston (Emory, 1848), members of a U.S. Army party en route from Fort Leavenworth, Kansas to San Diego, California. Their party travelled westward from the Rio Grande Valley in southern New Mexico and struck the Gila River on 20 October 1846 at the mouth of Mangas Creek, south of the present town of Cliff. At that point they described the river and its vegetation much as these exist now in less-disturbed areas. Their ornithological observations are limited to the report of numerous "blue" or "California" quail (apparently *Lophortyx gambelii*) and signs of turkey.

The first collection of birds from the valley was made by H. W. Henshaw, who travelled along the river from the Arizona line to its headwaters in October and November 1873. The first collection of breeding birds was made in the valley in May and June of 1876 by Frank Stephens (erroneously spelled *Stevens* in the papers cited here); other observations on the breeding birdlife were obtained by R. W. Barrell in the summer of 1890 (Bailey, 1928).



**Map 1:** The Gila Valley in the southwestern United States (inset) and the study area in southwestern New Mexico (shaded sections).

After the turn of the century, the Gila Valley received the attention of the U.S. Biological Survey, but mainly outside the breeding season: F. M. and V. O. Bailey made collections of birds near Cliff in November 1906, and E. A. Goldman collected near Redrock and the town of Gila in September and October 1908 (Bailey, 1928). R. T. Kellogg, from 1912 through 1937, and J. S. Ligon, from the 1920's through the 1950's, both intermittently collected and recorded the birdlife of the area. Since the middle of this century the Gila Valley has received the increasing attention of ornithologists, many of whom have contributed to this study.

## METHODS AND TERMINOLOGY

I engaged in at least limited field work in the Gila Valley in each year from 1957 through 1970, with the exception of 1962, 1966, and 1969. At least parts of 85 different days have been spent there, including 42 days in the main breeding season (May through August). The periods of most intensive work were from 1959 through spring 1962 and in the summer of 1968. Most intensively worked has been the Cliff area (65 dates), followed by the Redrock area (20 dates) and the Virден area (6 dates) (see Map 1). Field work included a complete aerial survey of the valley in December 1967. I have not worked in the Gila Narrows nor in the lower Gila Box Canyon because of the difficulty of access.

The study area is along the Gila River from the mouth of Mogollon

Creek in the north to the Arizona line in the south (Map 1). Habitats and their birdlife were studied from the river and flood plain to the crest of the valley slopes, including the cliffs which front the river near Mogollon Creek and between Cliff and Redrock. The emphasis of study of the birds was to determine what species were present, whether or not they were breeding locally, and what their abundance and frequency of occurrence were. Habitat usage, dates of arrival in spring (if migratory), and related aspects were also determined for breeding species. Abundance and frequency of occurrence are used here in the sense of Hubbard (1970), which is summarized as follows:

SCALE OF ABUNDANCE (in order of increasing numbers): rare, uncommon, fairly common, common, abundant.

FREQUENCY OF OCCURRENCE (in order of increasing frequency): casual, occasional, irregular, regular.

Habitat usage by breeding birds is summarized in part by assignment to one of four categories. These categories are based on the degree of usage of riparian habitats in the breeding season, as determined by observations in the Gila Valley and its immediate vicinity. The categories are as follows (the abbreviations for these categories are used in the Annotated List of Species presented later in this paper):

RESTRICTED RIPARIAN (RR)—occupying riparian habitats exclusively or nearly so in the breeding season.

PRIMARY RIPARIAN (PR)—occupying primarily riparian habitats in the breeding season, but making varying use of adjacent nonriparian habitats.

SECONDARY RIPARIAN (SR)—occupying nonriparian habitats extensively in the breeding season, but making varying use of riparian habitats.

NONRIPARIAN (NR)—occupying nonriparian habitats exclusively or nearly so in the breeding season, except for drinking and bathing.

Subspecific determinations are based on material examined and determined by me, with collections designated as follows (these abbreviations are used in the Annotated List of Species presented later):

- CNH Cincinnati Natural History Museum
- MCZ Museum of Comparative Zoology, Harvard University
- MVZ Museum of Vertebrate Zoology, University of California
- PM Peabody Museum, Yale University
- SD San Diego Natural History Museum
- UA University of Arizona
- UM University of Michigan, Museum of Zoology
- US National Museum of Natural History (United States)
- WNM Western New Mexico University

Plant names and ecological terms follow Castetter (1956), Kearney and Peebles (1960), and Little (1950). Map information is from the United States Geological Survey and the Forest Service.

## DESCRIPTION OF THE VALLEY

The Gila River arises in the mountains of the Mogollon Plateau in southwestern New Mexico and flows (or flowed) westward through

southern Arizona to the Colorado River (see Map 1). The river emerges from the plateau at the mouth of Mogollon Creek (elevation 4700 feet) and flows southward for some 20 miles, then southwestward for 20 miles, and finally westward for 15 miles to enter Arizona (elevation 3700 feet). Over much distance the river traverses mainly rolling plains and low hills, but between Cliff and Redrock it penetrates the northwestern foothills of the Burro Mountains. For approximately 7 miles through this area the river has cut a narrow, steep-sided gorge, which is called the Gila Box Canyon. Between Redrock and Virden the river has cut a lesser canyon, which is called the Gila Narrows (F. D. Trauber, U.S. Geological Survey, pers. comm.).

Except for these two canyons, the valley of the Gila is a sunken trough varying from a few score to several hundred feet in depth, with slopes that vary from steep to gentle. On their floors the two canyons are 50 to 500 (occasionally 1000) feet wide, whereas elsewhere the valley is generally 500 to 2500 feet wide. Exceptionally wide areas are around Virden (5500 to 7000 feet), Cliff (4500 to 6000 feet), and Redrock (1500 to 4500 feet).

The river has been straightened and diked in agricultural areas, although elsewhere it has been allowed to meander. Its sandy or rocky channel is seldom more than 50 feet in width and 2 feet in depth, and it is usually only partly filled by the river. The channel banks are generally 3 feet high or less, except where the river has undercut the 8- to 12-foot-high retaining levees (e.g., near Cliff). There are several intermittent tributaries of the Gila in the study area, but only two need to be mentioned here: one is Mogollon Creek, about 7 miles northeast of Cliff, and the other is Duck Creek, which flows through Cliff (see Map 1). Mogollon Creek is notable because of its well-developed riparian woodland, especially stands of sycamores (*Platanus wrightii*). Duck Creek merges broadly with the Gila and has similar vegetation, and I include it within the study area.

In referring to the distribution of habitats and birds, I find designation of three general areas useful (see shaded sections of Map 1):

**VIRDEN AREA**—western section of the study area, centered on the town of Virden; approximately 6 miles in length, extending from the Arizona line eastward.

**REDROCK AREA**—central section of the study area, centered on the settlement of Redrock; 8 miles long, extending southward from the southern end of the Gila Box Canyon; includes Redrock Marsh.

**CLIFF AREA**—northern section of the study area, centered on the town of Cliff; approximately 17 miles long, extending from the northern end of the Gila Box Canyon north to the mouth of Mogollon Creek; includes the towns of Gila and Buckhorn, as well as Buckhorn Marsh, Duck Creek, and Ormond's Pond. U.S. Highway 180 divides this area into northern and southern portions.

The defunct town of Carlisle, which was located 15 miles northeast of Redrock (Bailey, 1928), was apparently in or near the Gila Box Canyon.

### DESCRIPTION OF HABITATS

**Riparian habitats:** These habitats appear to be dependent on the river for survival in the study area, and they are restricted to the valley floor.

**RIPARIAN SHRUBLAND.** This habitat is dominated by the woody, evergreen shrub seepwillow (*Baccharis glutinosa*), which grows to heights of 6 to 8 feet and forms stands 5 to 50 or more feet in width (Figure 2). This habitat is the immediate associate of the river channel and is interposed between it and riparian woodland.

**RIPARIAN WOODLAND.** Beyond the riverside band of seepwillow on the mesic valley floor is riparian woodland (Figure 3), whose two constant and prominent members are Fremont cottonwood (*Populus fremontii*) and Goodding willow (*Salix gooddingii*). The cottonwoods grow to heights of 50 to 70 feet (Figure 4) and the willows reach 20 to 40 feet. Together they form an open (possibly because of grazing) to densely understoried woodland. Often associated with them is boxelder (*Acer negundo*), as well as a profusion of forbs, grasses, and some shrubs (e.g., *Amorpha fruticosa*). Other widespread tree species are Arizona walnut (*Juglans major*), netleaf hackberry (*Celtis reticulata*), desert-willow (*Chilopsis linearis*), and locally the Arizona sycamore (*Platanus wrightii*), all usually growing on sites peripheral to and more stable



Figure 2: The Gila River between Mogollon and Turkey Creeks, showing dense riparian shrubland dominated by seepwillow (left).



**Figure 3:** Riparian woodland in the Gila Valley, just below Mogollon Creek. Riparian shrubland visible along the river, with microphyll shrubland (slope mesquite type) in the foreground.



**Figure 4:** Fremont cottonwoods at the mouth of Mogollon Creek, with Goodding willow and seepwillow in the background.

than those of the cottonwood-willow association. Other scarcer trees and shrubs include Texas mulberry (*Morus microphylla*), squawberry (*Rhus trilobata*), and velvet ash (*Fraxinus velutina*), while generally rare are California buckthorn (*Rhamnus californica*), Arizona alder (*Alnus oblongifolia*), wavy willow (*Salix irrorata*), western soapberry (*Sapindus drummondii*), and the introduced Russian olive (*Eleagnus angustifolia*), honeylocust (*Gleditsia triacanthos*), and tamarisk (*Tamarix gallica*).

The extent of riparian woodland appears correlated, under natural conditions, with the width of the flood plain. Where the valley floor is narrow, the action of erosion, flooding, and channel shifting results in an unstable substrate, which apparently prevents trees from becoming established except in sheltered or otherwise stable sites. As a consequence, riparian woodland is absent or poorly developed in canyons; instead, riparian shrubland dominates (see Figure 2). On the broader valley floor, where the action of these forces is less detrimental and the substrate less disturbed, trees grow abundantly (see Figures 1 and 3) and riparian shrubland is usually confined to a narrow fringe along the river.

While the development of riparian woodland is favored on broad valley floors, these are also the areas selected by man for clearing and agricultural activity. As a result, woodland has been removed from all but limited portions of the broader floors, usually remaining only as a stabilizing strip a few hundred feet wide or less along the river (Figures 5 and 6). Additional areas occupied by cottonwoods and willows are irrigation ditch banks, where trees are planted to stabilize the substrate.

It is now difficult to judge how extensive riparian woodland was on broader valley floors in primeval times, but some of the older residents of the Cliff area claim that in the early days cottonwoods occurred there solidly from slope to slope. This would have constituted a woodland over 1 mile wide. At present the maximum width of riparian woodland rarely reaches 2000 feet in the valley (e.g., below the mouth of Mogollon Creek); at most, 30 per cent of the broader valley floors is occupied near Cliff (see Figure 5) and Redrock, and only 5 to 10 per cent near Virden. In spite of these drastic reductions, riparian woodland is still fairly extensive in the Gila Valley, particularly north of Cliff and between Cliff and Redrock.

The Fremont cottonwood-Goodding willow association occurs northward in the Gila Valley to about the mouth of Turkey Creek, which is several miles north of Mogollon Creek. The cottonwood, along with the Arizona walnut and Arizona sycamore, is characteristically a Sonoran species, which is limited in New Mexico to the southwestern portion of the state; and the Gila Valley is one of their major areas of occupancy.

**MARSHLAND.** Whether natural marshes existed in the Gila Valley in earlier times is not known, but at present few if any exist that do not





**Figure 5:** Broad flood plain of the Gila Valley in the Cliff area, with riparian fields and woodland interspersed. Town of Gila is visible beyond.



**Figure 6:** Broad flood plain of the Gila Valley in the Cliff area, with riparian fields and tree-lined ditch banks in the foreground and riparian woodland in the background.

appear to result from man's activities. In primeval times, marshes may have formed around sloughs that became cut off from the river as the channel shifted, particularly if riparian woodland also shifted. At present, sloughs exist in several areas (Figure 7), but these are heavily shaded by riparian woodland and support little emergent vegetation. With continued felling of trees by beavers (*Castor canadensis*), however, shade may disappear over some of these areas and marshes may develop.

The largest marshland in the valley now is Redrock Marsh, northeast of Redrock on the west side of the river. This marsh varies in extent from perhaps 2 to 10 acres, depending on winter and spring moisture conditions. It is formed by the impoundment of an arroyo to protect agricultural lands from runoff (W. Huey, N. M. Game and Fish Department, pers. comm.). In June 1967 the marsh was very small, but in June 1968 it was large and thriving, consisting predominantly of sedges (*Scirpus californicus*, *Eleocharis palustris*), with patches of cattails (*Typha* sp.) and a few thickets of tamarisk. Other smaller marshes are at Ormond's Pond, near Cliff (Figure 8), and Buckhorn Marsh, near Buckhorn (7 miles northwest of Cliff); both are dominated by cattails.

**RIPARIAN FIELDS.** In the Cliff, Redrock, and Virden areas, extensive areas of the valley floor have been cleared for irrigated agriculture (see Figures 5 and 6). Most of the fields are used for forage crops and pasture, but at Virden, especially, various row crops are raised and cotton farming has been carried out in past years. Grazing is not restricted to pastures but occurs to some extent in all habitats. Over-



Figure 7: Slough in the Cliff area, separated from the Gila River by an earthen dike. Trees killed by water and felled by beavers can be seen.

grazing has doubtlessly aided the spread of mesquite, yuccas, and cacti into grasslands; and it is probably also deterring reproduction of riparian woodland.

**Semiriparian habitat:** This habitat exists in two formations: a valley type, apparently dependent on the river, and a slope type, apparently independent of the river.

**MICROPHYLL SHRUBLAND.** This widespread habitat type occurs northward to Turkey Creek (Figure 9) and is dominated by mesquite (*Prosopis juliflora*), often with catclaw (*Acacia greggii*), burrobush (*Hymenoclea monogyra*), soapweed (*Yucca elata*), and various cacti (*Opuntia* spp.). From the Gila Box Canyon southward, creosotebush (*Larrea divaricata*) also occurs commonly, and on some eroded slopes and gravel-covered flats it is the dominant shrubby species.

On the floor of the valley and in arroyo bottoms, microphyll shrubland is dominated by mesquites in the form of large shrubs and small trees (up to 15 feet) in a relatively dense growth which I call *valley mesquite* (Figure 9). On slopes and elsewhere beyond the valley floor the mesquites of microphyll shrubland form a more open habitat composed of low (5 feet or less) shrubby growth which I call *slope mesquite* (Figure 10). The distinction between these two types is reflected in avian habitat preferences, as well as in the structure and growth form of the shrubland.

**Nonriparian habitats:** These habitats are seemingly independent of the river for their survival in the study area. Although growing mainly on the slopes and beyond, one type (evergreen woodland) also occurs on the floor of the valley; unlike microphyll shrubland, its structure and growth form are not markedly different between the valley floor and the slopes.



Figure 8: Ormond's Pond, near Cliff, an artificial cattail marsh.

EVERGREEN WOODLAND. This habitat type is dominated by live oaks (*Quercus emoryi*, *Q. grisea*) that occur as trees to 30 feet in height (Figure 11), often with such species as hackberry, walnut, sycamore, and juniper (*Juniperus* spp.). These woodlands are most prevalent from the Gila Box Canyon northward and occur mainly in the outer floor of narrower parts of the valley, in tributary canyons, and in arroyos on the slopes.



Figure 9: Microphyll shrubland (valley mesquite type) in the Gila Valley between Mogollon and Turkey Creeks. The large tree is a sycamore.



Figure 10: Microphyll shrubland (slope mesquite type) in the vicinity of Cliff. Prickly pear cactus is in the foreground.

**GRASSLAND.** Over most of the level country, on many hills, and on gentle slopes of the valley, grass is the dominant vegetation, either in pure stands or often intermixed with various shrubby plants and forbs (Figure 12). The most important adventive plants in grassland are various cacti, soapweed, mesquite, catclaw, and various bushy composites.



**Figure 11:** Evergreen woodland dominated by oaks in the Gila Valley between Mogollon and Turkey Creeks. In the background are microphyll shrubland and riparian woodland.



**Figure 12:** Grassland in the vicinity of Cliff, with riparian woodland along Duck Creek in the background.

EVERGREEN SHRUBLAND. On steeper slopes from the Gila Box Canyon northward are shrublands consisting mainly of evergreen species, such as scrub oak (*Quercus turbinella*), squawbush, silk-tassel (*Garrya wrightii*), mountain-mahogany (*Cercocarpus* sp.), beargrass (*Nolina microcarpa*), datil (*Yucca baccata*), sotol (*Dasylirion wheeleri*), and others. This shrubland is often associated or mixed with evergreen woodland and microphyll shrubland elements, especially oaks, junipers, cat-claw, mesquite, and cacti.

### ANNOTATED LIST OF SPECIES

The following is a list of all species that have been recorded in the Gila Valley in June and the first half of July, plus those that have been found breeding at other times of the year. Breeding and probable breeding species are prefixed by an asterisk (\*). The criteria for designating abundance and frequency of occurrence are discussed in the section on methods and terminology (see also Hubbard, 1970), where the reader will also find the key to the abbreviations. Habitats and localities are discussed in appropriate sections of this paper. Names of people in this list are those of observers and collectors of particular records. Taxonomy and sequence of species follow the A.O.U. Check-list (1957).

\* **Pied-billed Grebe:** *Podilymbus podiceps*. (RR)—Casual in summer at Redrock Marsh, where a pair and an empty nest were found in June 1968.

\* **Great Blue Heron:** *Ardea herodias*. (RR)—Regular resident throughout the valley; uncommon to fairly common, breeding in riparian woodland and feeding mainly along the river. Nesting colonies are known in the Cliff and Redrock areas.

\* **Green Heron:** *Butorides virescens*. (RR)—Occasional resident; rare along the river and in adjacent shrubland and riparian woodland. Summer occurrences are of an adult at a nest near Cliff in 1959 (D. A. Zimmerman) and an adult at Redrock Marsh on 27 June 1968.

**Common Egret:** *Casmerodius albus*. Casual in summer at Redrock Marsh, where two adults were seen on 17 July 1962 (J. L. Sands); these were probably migrants.

\* **Black-crowned Night Heron:** *Nycticorax nycticorax*. (RR)—Casual in summer at Buckhorn Marsh, where an immature was seen on 22 and 25 June 1968; the bird, which was molting and not able to fly well, was presumably hatched locally.

**Least Bittern:** *Ixobrychus exilis*. Casual in summer at Redrock Marsh, where a female was seen on 27 June 1968; probably a vagrant, but this species may be a rare summer resident in the area.

**Black-bellied Tree Duck:** *Dendrocygna autumnalis*. Casual at Redrock Marsh, where two adults were seen on 27 June 1968; earlier in 1968, three ducks were flushed from trees at their marsh (G. Hightower), and these may have been this species.

\* **Mallard:** *Anas platyrhynchos*. (RR)—Irregular to regular resident in the Cliff area; rare to uncommon and local in summer near water. Occurs in summer and may also breed south to Redrock Marsh, but this requires confirmation.

\* **Mexican Duck:** *Anas diazi*. (RR)—Occasional to irregular in summer at Redrock Marsh, where definitely recorded in 1965 (B. K. Harris), 1967, and 1968. A brood of this or the species just mentioned was seen there in June 1968 (G. Hightower). Johnsgard (1961) maps a "breeding" specimen near Virden but gives no other details concerning the record.

**Gadwall:** *Anas strepera*. Casual in summer at Redrock Marsh, where a female was seen on 27 June 1968.

**Green-winged Teal:** *Anas carolinensis*. Casual in summer at Redrock Marsh, where a male was seen on 14 June 1968.

\* **Blue-winged Teal:** *Anas discors*. (RR)—Casual in summer at Redrock Marsh, where a pair was present and a nest was found in 1968. The nest contained nine eggs which hatched successfully; identification was made by personnel of the New Mexico Game and Fish Department (G. Hightower).

\* **Cinnamon Teal:** *Anas cyanoptera*. (RR)—Occasional in summer at Redrock Marsh, where two to five pairs were seen in 1967 and 1968.

**American Widgeon:** *Anas americana*. Casual in summer at Redrock Marsh, where a male was seen on 27 June 1968.

\* **Common Merganser:** *Mergus merganser*. (RR)—Irregular resident in the Cliff area (south to the Gila Box Canyon); rare to uncommon and local in summer in the river and its immediate vicinity, especially where there are cliffs.

**Ruddy Duck:** *Oxyura jamaicensis*. Casual in summer at Redrock Marsh, where a male was seen on 14 June 1968.

\* **Turkey Vulture:** *Cathartes aura*. (SR)—Regular in summer throughout the valley; fairly common over all habitats. Early dates: 15 March 1959 (Redrock); 12 March 1960 and 25 March 1961 (Cliff).

**Sharp-shinned Hawk:** *Accipiter striatus*. Occasional in summer near Mogollon Creek, where one was seen several times in June and July 1969 (D. A. Zimmerman); possibly breeds.

\* **Cooper's Hawk:** *Accipiter cooperii*. (PR)—Irregular to regular resident in the Cliff and Redrock areas; rare to uncommon and local in the summer in riparian woodland and adjacent habitats.

\* **Red-tailed Hawk:** *Buteo jamaicensis*. (SR)—Regular resident throughout the valley; rare to uncommon and local in summer over most habitats, breeding on cliffs and in trees.

\* **Swainson's Hawk:** *Buteo swainsoni*. (SR)—Regular summer resident throughout the valley; rare to fairly common in riparian woodland and open habitats. Rarely seen in concentrations when migrating, although 10 to 12 circled over Gila on 2 September 1959. Early dates: 9 April 1960 and 22 April 1961 (Cliff).

\* **Zone-tailed Hawk:** *Buteo albonotatus*. (PR)—Occasional in summer through the valley; rare in riparian woodland and adjacent habitats. A nest with eggs was found and an adult collected in the Virden area on 28 May 1876 (SD). Casual in winter near Redrock, where three adults were seen on 13 February 1960; two of these seemed to be engaged in a courtship flight, which consisted of the locking of feet and tumbling earthward to release just above the ground. Early date: 9 April 1959 (Silver City).

\* **Gray Hawk:** *Buteo nitidus*. (RR?)—Casual near Cliff, where an adult and an immature were reported on 24 July 1953 (Ligon, 1961). The only other state records are of two sets of eggs taken at Fort Bayard, 50 miles east of the Gila Valley, by Frank Stephens in 1876 (Bailey, 1928); one set of eggs is at the American Museum of Natural History and its identity has been verified by Dean Amadon (*in litt.*).

\* **Black Hawk:** *Buteogallus anthracinus*. (RR)—Regular summer resident in the Cliff and Redrock (formerly?) areas; rare to uncommon and local in riparian woodland. In addition, an adult was seen at a nest near Virden on 23 June 1968, and the species may summer there. Early dates: 19 March 1960 (Redrock) and 22 March 1964 (Redrock—B. K. Harris).

\* **Golden Eagle:** *Aquila chrysaetos*. (NR)—Regular resident in the Cliff and Redrock areas; rare to uncommon and local in open habitats, nesting on cliffs.

**Peregrine Falcon:** *Falco peregrinus*. Casual in summer at Redrock Marsh, where an adult was seen on 25 July 1964.

\* **Sparrow Hawk:** *Falco sparverius sparverius*. (SR)—Regular resident throughout the valley; uncommon to common in riparian woodland and adjacent habitats.

\* **Scaled Quail:** *Callipepla squamata pallida*. (NR)—Occasional resident in the Redrock area; rare to uncommon in grassland and grassy shrubland.

\* **Gambel's Quail:** *Lophortyx gambelii gambelii*. (SR)—Regular resident throughout the valley; uncommon to common in microphyll shrubland and other open habitats.

\* **Harlequin Quail:** *Cyrtonyx montezumae mearnsi*. (NR)—Occasional resident in the Cliff area; rare to uncommon in evergreen shrubland/woodland and adjacent habitats. Records include two molting juveniles taken on 26 October 1873 by H. W. Henshaw (US) and a male taken on 6 March 1933 by A. Brooks (MVZ).

\* **Ring-necked Pheasant:** *Phasianus colchicus*. (RR)—Introduced resident in the Cliff and Redrock areas; rare to fairly common in riparian fields and adjacent habitats. The species seems to maintain itself in the wild, but it is restricted in its ability to use native habitats. A white-winged form (*P. c. bianchii*) has been introduced in recent years.

**Chukar:** *Alectoris chukar*. Unsuccessful introduction in Gila Valley.



**Black Francolin:** *Fraucolinus francolinus*. Unsuccessful introduction in the Gila Valley.

\* **Sora:** *Porzana carolina*. (RR) —Occasional in summer in Redrock Marsh and casual near Cliff, where one was heard on 18 June 1968; rare in marshland and adjacent habitats.

\* **American Coot:** *Fulica americana*. (RR) —Occasional to irregular summer resident in the Cliff area (Buckhorn Marsh, Ormond's Pond) and at Redrock Marsh; rare to common in marshland.

**Common Gallinule:** *Gallinula chloropus*. Occasional in summer at Buckhorn Marsh, where one or two were seen in 1970 (R. A. Fisher).

\* **Killdeer:** *Charadrius vociferus vociferus*. (PR) —Regular resident throughout the valley; rare to common in open habitats near water.

\* **Spotted Sandpiper:** *Actitis macularia*. (RR) —Occasional to irregular summer resident in the Cliff area (south to the Gila Box Canyon); rare to uncommon along the river. A pair and three grown young were seen near Gila on 26 July 1959. Early dates: 4 April 1959, 12 March 1960, and 24 March 1961 (Cliff); occasional in winter.

\* **Band-tailed Pigeon:** *Columba fasciata fasciata*. (NR) —Occasional to irregular summer resident in the Cliff area (south to the Gila Box Canyon); rare to common in evergreen woodland and adjacent habitats. Reported nesting in live oaks near Cliff by Bailey (1928). Early dates: 19 April 1959 and 4 March 1960 (Silver City area).

\* **White-winged Dove:** *Zenaida asiatica mearnsi*. (PR) —Regular resident in the Redrock and Virden areas, irregularly north to the southern Cliff area; rare to fairly common in valley mesquite, riparian woodland, and adjacent habitats. Early dates: 15 May 1959 (Silver City) and 21 May 1960 (Cliff).

This species seems to vary in abundance and, perhaps, areas of occurrence from year to year. Its early status in the Gila Valley is not clear, but occupancy of the area may be relatively recent (Phillips, 1968).

\* **Mourning Dove:** *Zenaidura macroura*. (SR) —Regular resident throughout the valley; fairly common to common in wooded and shrubby habitats. Eggs laid from early April to early October (C. Hill).

**Ground Dove:** *Columbigallina passerina pallescens*. There are several sight records from the Gila Valley and a specimen was taken at Redrock on 30 December 1928 (R. T. Kellogg, CNH), but no evidence of breeding has been obtained. A report of one at Redrock on 25 July 1964 (McKnight and Niles, 1964) is erroneous and refers to two seen near Rodeo, Hidalgo County, May 1964.

\* **Inca Dove:** *Scardafella inca*. (NR) —Regular resident near Virden, where first recorded in 1947 (Ligon, 1961); rare to uncommon near habitations. Casual near Redrock, where a specimen was taken on 17 June 1926 (J. S. Ligon, PM).

\* **Yellow-billed Cuckoo:** *Coccyzus americanus*. (RR) —Regular summer resident in the Cliff and Redrock areas; rare to uncommon in ripar-

ian woodland. Early dates: 4 June 1958 (Silver City area); 4 June 1967 and 12 June 1968 (Redrock).

\* **Roadrunner:** *Geococcyx californianus*. (NR)—Irregular to regular resident throughout the valley; rare to uncommon in microphyll shrubland and other shrubby habitats.

\* **Barn Owl:** *Tyto alba pratincola*. (SR)—Occasional to irregular resident in the Cliff and Redrock areas; rare to uncommon in riparian woodlands and adjacent habitats. This owl is probably overlooked to some degree and can be expected to occur in the Virden area as well.

\* **Screech Owl:** *Otus asio cinerascens*. (PR)—Irregular to regular resident in the Cliff and Redrock areas (casual near Virden, June 1968); rare to uncommon in riparian and evergreen woodland.

\* **Great Horned Owl:** *Bubo virginianus pallescens*. (SR)—Regular resident in the Cliff and Redrock areas (occasional near Virden); rare to uncommon in wooded habitats.

\* **Elf Owl:** *Micrathene whitneyi whitneyi*. (PR)—Regular summer resident in the Cliff and Redrock areas; uncommon to common in riparian woodland (particularly sycamores) and locally in adjacent oak woodland. Early dates: 1 April 1960 (Redrock) and 3 April 1961 (Silver City area).

\* **Poor-will:** *Phalaenoptilus nuttallii nuttallii*. (NR)—Irregular to regular summer resident throughout the valley; uncommon in semi-open, nonriparian habitats. Early dates: 25 April 1958 and 22 April 1959 (Silver City area); 1 April 1960 (Redrock); 22 April 1961 (Cliff).

\* **Common Nighthawk:** *Chordeiles minor henryi*. (NR)—Irregular in summer in the Cliff area and occasionally near Redrock; uncommon over all habitats, probably breeding in evergreen shrubland/woodland. Early dates: 13 May 1959 and 27 May 1961 (Silver City).

\* **Lesser Nighthawk:** *Chordeiles acutipennis texensis*. (NR)—Regular summer resident in the Redrock and Virden areas, irregular in the southern Cliff area; rare to common over all habitats, probably breeding in microphyll shrubland. Casual at Mogollon Creek, where one was seen on 23 April 1960.

\* **Black Swift:** *Cypseloides niger borealis*. Occasional in the southern Cliff area, where recorded on 31 May 1967 (UA, US), and in early June of 1967 and 1969 (D. A. Zimmerman). These appear to have been migrants.

\* **White-throated Swift:** *Aeronautes saxatalis*. (NR)—Irregular summer resident in the Cliff area (south to the Gila Box Canyon), occasionally near Redrock; rare to uncommon over all habitats, probably breeding in nearby cliffs. Early dates: 17 April 1958 and 14 March 1959 (Silver City area); 13 February 1960 (Redrock); 25 March 1961 (Cliff).

\* **Black-chinned Hummingbird:** *Archilochus alexandri*. (PR)—Irregular to regular summer resident in the Cliff and Redrock areas, and probably near Virden; rare to uncommon and local in valley mes-

quite, riparian woodland, and adjacent habitats. Early date: 23 April 1960 (Cliff).

\* **Costa's Hummingbird:** *Calypte costae*. (NR?)—Casual near Cliff, where a male was seen at a nest in May 1876, by F. Stephens (Bendire, 1895). This record seems satisfactory on the basis of the distinctiveness of the male of this species and Stephens' field ability. He took a male Black-chinned Hummingbird in the area on 7 June 1876 (SD), which indicates that he would have been aware of that species' presence.

\* **Broad-tailed Hummingbird:** *Selasphorus platycercus*. Occasional to irregular in summer in the Cliff and Redrock areas; rare to uncommon. These are presumably migrants rather than breeders.

\* **Red-shafted Flicker:** *Colaptes auratus collaris*. (PR)—Irregular to regular resident in the Cliff and Redrock areas, occasional near Virden; rare to uncommon in summer in riparian woodland.

\* **Gila Woodpecker:** *Centurus uropygialis uropygialis*. (RR)—Regular resident throughout the valley, more local in the northern Cliff area (north to Mogollon Creek); rare to fairly common in riparian woodland.

This species was not recorded in the Gila Valley until 1908 (US), which suggests a recent occupancy of the area.

\* **Acorn Woodpecker:** *Melanerpes formicivorus formicivorus*. (SR)—Irregular resident in the Cliff area (south to the Gila Box Canyon); rare to uncommon and local in riparian and oak woodlands.

\* **Hairy Woodpecker:** *Dendrocopos villosus leucothorectis*. (RR)—Occasional to irregular resident in the Cliff area; rare and local in riparian woodland. A female (UM), taken on 29 April 1964 at Mogollon Creek, had an egg in her oviduct.

\* **Ladder-backed Woodpecker:** *Dendrocopos scalaris cactophilus*.—Regular resident throughout the valley; uncommon to fairly common in wooded and shrubby habitats.

\* **Western Kingbird:** *Tyrannus verticalis*. (SR)—Regular summer resident throughout the valley; fairly common to common in wooded and shrubby habitats. Early dates: 4 April 1959 (Cliff), 2 April 1960 (Redrock), and 13 April 1961 (Silver City).

\* **Cassin's Kingbird:** *Tyrannus vociferans*. (SR)—Regular summer resident in the Cliff and Redrock areas, and locally near Virden; rare to common in wooded habitats. Early dates: 29 April 1958 and 17 April 1961 (Silver City area); 18 April 1959 (Cliff); 2 April 1960 (Redrock).

\* **Wied's Crested Flycatcher:** *Myiarchus tyrannulus magister*. (RR)—Irregular to regular summer resident throughout the valley; rare to fairly common and generally local in riparian woodland. Numbers seem to vary from year to year and the species may be absent from some areas at intervals.

For many years the only record from the valley was of a specimen taken on 12 June 1876 by F. Stephens (SD), but the species may have

generally been overlooked in subsequent years, especially in view of annual fluctuations in numbers.

\* **Ash-throated Flycatcher:** *Myiarchus cinerascens cinerascens*. (SR) — Irregular to regular summer resident throughout the valley; rare to common in wooded and shrubby habitats. Early dates: 26 April 1958 and 22 April 1961 (Silver City area); 4 April 1959 and 9 April 1960 (Cliff).

\* **Black Phoebe:** *Sayornis nigricans semiatra*. (RR) — Irregular to regular resident throughout the valley; uncommon to common, mainly near water, and breeding on bridges, banks, and cliffs.

\* **Say's Phoebe:** *Sayornis saya saya*. (NR) — Irregular to regular resident throughout the valley; rare to uncommon in open, nonriparian habitats, breeding on buildings and other structures. Less numerous and more local in winter.

\* **Traill's Flycatcher:** *Empidonax traillii brewsteri*. (RR) — Irregular to regular summer resident in the Cliff and Redrock areas (occasional near Virden); rare to fairly common in riparian woodland, especially willows near standing water. Early dates: 6 May 1960 and 1961 (Cliff).

**Western Flycatcher:** *Empidonax difficilis*. Occasional to irregular in June in the valley as a rare to uncommon migrant.

\* **Western Wood Pewee:** *Contopus sordidulus veliei*. (PR) — Regular summer resident throughout the valley; uncommon to common in riparian woodland and adjacent habitats. Early dates: 1 May 1958, 7 May 1959, and 3 May 1961 (Silver City area); 30 April 1960 (Cliff).

**Olive-sided Flycatcher:** *Contopus borealis*. Occasional in June in the Cliff and Redrock areas, as a rare to uncommon late spring migrant.

\* **Vermilion Flycatcher:** *Pyrocephalus rubinus flammeus*. (PR) — Regular summer resident throughout the valley; uncommon to fairly common in riparian woodland and adjacent habitats, generally near water. Occasional and rare in winter, mainly in the form of single immature males. Early dates: 8 March 1959 (Redrock); 21 March 1960 and 24 March 1961 (Cliff).

\* **Horned Lark:** *Eremophila alpestris occidentalis*. (NR) — Irregular resident in the Cliff area; rare to fairly common in summer in grassland.

**Violet-green Swallow:** *Tachycineta thalassina lepida*. Occasional in summer in the Cliff area, where recorded in 1968 and in 1969 (D. A. Zimmerman); possibly breeds in the study area.

\* **Tree Swallow:** *Iridoprocne bicolor*. (RR) — Casual in summer near Cliff, where a nesting pair was found in June 1968. The nest was in a willow at Ormond's Pond and contained six eggs when photographed on 27 June. Early dates: 18 April 1959, 19 March 1960, and 24 March 1961 (Cliff).

\* **Rough-winged Swallow:** *Stelgidopteryx ruficollis*. (PR) — Irregular to regular summer resident throughout the valley; uncommon to common along the river and adjacent habitats, breeding in holes in the banks. Early dates: 21 March 1959, 12 March 1960, and 24 March 1961

(Cliff); 8 March 1964 and 21 March 1965 (Cliff—B. K. Harris).

Specimens (US) appear to be intergrades between *S. r. serripennis* and the weakly characterized *S. r. psammochrous*.

\* **Barn Swallow:** *Hirundo rustica erythrogaster*. (SR)—In 1968 occurred as a local summer resident in the Cliff and Virden areas (casual at Redrock); uncommon to fairly common, breeding on bridges, on habitations, and in road culverts. Absence of summer records in other years may be due to sampling error rather than the absence of this species as a breeding bird. Early dates: 2 April 1960 (Redrock) and 24 March 1961 (Cliff).

\* **Cliff Swallow:** *Hirundo pyrrhonota*. (SR)—Irregular to regular summer resident throughout the valley; uncommon to fairly common and local, breeding on bridges and cliffs. Early dates: 8 March 1959 (Redrock), 27 April 1960 (near Silver City), and 24 March 1961 (Cliff).

Forehead color in summer birds from the general area varies from whitish to chestnut, suggesting an intergrade area between *H. p. tachina* and *H. p. melanogaster* (UM).

\* **Scrub Jay:** *Aphelocoma coerulescens woodhousei*. (NR)—Occasional to irregular resident in the Cliff and Redrock areas; rare to uncommon and local in summer in evergreen woodland/shrubland. Reported breeding at Carlisle in the summer of 1890 (Bailey, 1928).

\* **Mexican Jay:** *Aphelocoma ultramarina arizonae*. (SR)—Regular resident in the Cliff area (south to the Gila Box Canyon); uncommon to fairly common and local in evergreen and adjacent riparian woodland.

\* **Common Raven:** *Corvus corax*. (SR)—Regular resident throughout the valley; rare to fairly common in and over all habitats. A nest in riparian woodland near Cliff contained large young on 27 June 1968.

\* **White-necked Raven:** *Corvus cryptoleucus*. (NR)—Irregular to regular resident in the Cliff and Redrock areas; rare to uncommon and local in summer in grassland. Outside the breeding season it invades other habitats, including riparian fields, sometimes in large numbers.

\* **Common Crow:** *Corvus brachyrhynchos hesperis*. (PR)—Occasional in summer in the Cliff area, where a presumed pair and three large young were present at Mogollon Creek in June 1968 (US). In 1969 one or more crows summered between Cliff and Redrock (D. A. Zimmerman).

The specimen is an adult male with worn wings which, even if intact, would not exceed 305 mm.; thus the specimen is referred to *C. b. hesperis* rather than the larger *C. b. hargravei*, described by Phillips (1942).

\* **Plain Titmouse:** *Parus inornatus plumbescens*. (NR)—Casual in the Cliff area (Mogollon Creek), where a juvenile was collected from a family group on 20 June 1968 (US).

\* **Bridled Titmouse:** *Parus wollweberi phillipsi*. (SR)—Regular resident in the Cliff area (south to the Gila Box Canyon); rare to uncom-

mon and local in riparian and evergreen woodlands.

\* **Verdin:** *Auriparus flaviceps ornatus*. (NR)—Regular resident in the Redrock and Virden areas, and northward irregularly to the southern Cliff area; uncommon to fairly common in valley mesquite and adjacent habitats.

\* **Common Bushtit:** *Psaltriparus minimus plumbeus*. (NR)—Occasional resident in the Cliff area (casually to Redrock); rare to uncommon and local in evergreen woodland/shrubland.

\* **White-breasted Nuthatch:** *Sitta carolinensis nelsoni*. (RR)—Irregular to regular resident in the Cliff and Redrock areas; uncommon in riparian woodland.

\* **Bewick's Wren:** *Thryomanes bewickii eremophilus*. (SR)—Regular resident throughout the valley; fairly common to common in riparian and evergreen woodlands.

\* **Cactus Wren:** *Campylorhynchus brunneicapillus couesi*. (NR)—Irregular to regular resident throughout the valley; uncommon to fairly common and local in microphyll shrubland and other habitats containing cacti.

\* **Canyon Wren:** *Catherpes mexicanus conspersus*. (NR)—Occasional to irregular resident in the Cliff and Redrock areas; rare to uncommon and local on cliffs.

\* **Rock Wren:** *Salpinctes obsoletus obsoletus*. (NR)—Occasional to irregular resident throughout the valley; rare to uncommon in rocky areas and cliffs.

\* **Mockingbird:** *Mimus polyglottos leucopterus*. (NR)—Regular summer resident (occasional resident) throughout the valley; uncommon to fairly common in shrubby nonriparian habitats. Early dates: 21 March 1959 and 19 March 1960 (Cliff area).

\* **Bendire's Thrasher:** *Toxostoma bendirei*. (NR)—Occasional summer resident near Cliff: a brooding female was taken near Gila on 9 April 1960 (WNM) and three pairs summered near Cliff in 1969, with a fledgling collected on 18 June (D. A. Zimmerman). This species may be overlooked in the study area because of confusion with other species and because of its shyness.

\* **Curve-billed Thrasher:** *Toxostoma curvirostre celsum*. (NR)—Regular resident in the Cliff and Redrock areas; rare to fairly common in microphyll shrubland and other habitats containing cholla cacti.

\* **Crissal Thrasher:** *Toxostoma crissale crissale*. (SR)—Occasional to irregular resident in the Redrock and Virden areas; rare to uncommon and local in dense microphyll and adjacent shrublands. This shy, easily overlooked species may be more widespread and numerous than present data indicate.

\* **American Robin:** *Turdus migratorius propinquus*. (RR)—Irregular to regular resident in the Cliff and Redrock areas; rare to uncommon and local in summer in riparian woodland.

**Blue-gray Gnatcatcher:** *Polioptila caerulea amoenissima*. Casual near Redrock, where a very worn adult female was taken on 24 July 1964 (UM). *P. melanura* would also be expected to occur in summer in the Gila Valley, but the only record is of two seen at Redrock on 3 February 1962 (D. A. Zimmerman).

\* **Phainopepla:** *Phainopepla nitens lepida*. (SR)—Occasional to irregular resident throughout the valley, but variable as to numbers and areas of occurrence; rare to common in valley mesquite, riparian and evergreen woodlands. In June 1968 it was common at Virden, where old nests and fledglings were seen; a grown young was also taken near Cliff on 9 June 1968 (US).

\* **Loggerhead Shrike:** *Lanius ludovicianus sonoriensis*. (NR)—Regular resident throughout the valley; rare to uncommon in shrubby grassland and other open, nonriparian habitats.

\* **Common Starling:** *Sturnus vulgaris vulgaris*. (RR)—Regular resident throughout the valley; uncommon to common and generally local in summer in riparian woodlands and fields. First recorded breeding in May 1960 near Cliff, and by 1968 definitely bred at Redrock and Virden as well. In the decade since 1960 it has increased notably as a summer bird. Possible adverse effects may occur to such native species as Elf Owls, Gila Woodpeckers, and Wied's Crested Flycatcher as competition develops with Starlings for nest holes.

\* **Bell's Vireo:** *Vireo bellii arizonae*. (PR)—Irregular to regular summer resident in the Redrock area and occasional in the Cliff (north to Mogollon Creek) and Virden areas; rare to uncommon in riparian woodland and valley mesquite. Early date: 2 April 1960 (Redrock).

\* **Gray Vireo:** *Vireo vicinior*. (NR)—Formerly a local and rare summer resident; uncommon. A specimen was taken near Redrock by F. Stephens in June 1876 (SD). Reported breeding at Carlisle in summer 1890 (Bailey, 1928). Now only an occasional migrant in the Gila Valley and vicinity. Early dates: 6 May 1933 (Redrock—A. Brooks, MVZ); 9 May 1960 and 7 May 1961 (Silver City area).

This vireo seems to have been a regular breeder in the past near Silver City and perhaps elsewhere in southwestern New Mexico, but it has seemingly declined in numbers and is rare in the area and very local.

**Solitary Vireo:** *Vireo solitarius*. Occasional in summer in the Cliff area, where recorded in 1968 and in 1969 (D. A. Zimmerman); possibly breeds in the area.

**Warbling Vireo:** *Vireo gilvus*. Occasional and uncommon in June in the Cliff and Redrock areas, presumably as a late migrant.

\* **Lucy's Warbler:** *Vermivora luciae*. (PR)—Regular summer resident throughout the valley; uncommon to common in riparian woodland/shrubland and valley mesquite. Early dates: 4 April 1959 and 24 March 1961 (Cliff); 2 April 1960 (Redrock); 28 March 1965 (Redrock—B. K. Harris).

In spite of the previous work of Stephens, Barrell, and others, this species was not recorded in the Gila Valley until 4 May 1928, when J. S. Ligon found it nesting at Redrock (Bailey, 1928). In the nearby San Francisco Valley the first records are those of H. H. Kimball, who took three specimens in April 1927 (UM), probably near Alma. These data suggest a rather recent occupancy of these valleys by this species. Occupancy of the Rio Grande Valley in New Mexico occurred by 1939–1942; the earliest record, a specimen taken at Las Cruces on 28 August 1920 (MCZ), probably represents a vagrant.

\* **Yellow Warbler:** *Dendroica petechia sonorana*. (RR)—Regular summer resident throughout the valley; fairly common to common in riparian woodland. Early dates: 14 April 1933 (Cliff—R. T. Kellogg, CNH); 18 April 1959 and 22 April 1961 (Cliff); 2 April 1960 (Redrock).

Two breeding specimens taken in June 1968 (US) are closest to this race, but an approach is shown toward *D. p. morcomi* in their being somewhat deeper yellow and heavier streaked than Arizona *D. p. sonorana*.

**Audubon's Warbler:** *Dendroica coronata auduboni*. Occasional in early June in the Cliff and Redrock areas, as a rare to uncommon migrant.

\* **Yellowthroat:** *Geothlypis trichas*. (RR)—Irregular to regular summer resident throughout; rare to uncommon and local in marshland, riparian shrubland, and riparian fields. Casual in winter near Cliff, where one was seen in November 1960 and on 21 January 1961. Early dates: 4 April 1959 and 22 April 1961 (Cliff); 2 April 1960 (Redrock).

**Wilson's Warbler:** *Wilsonia pusilla*. Occasional in June in the Cliff and Redrock areas, as a rare to uncommon migrant.

\* **Yellow-breasted Chat:** *Icteria virens auricollis*. (PR)—Regular summer resident throughout the valley; fairly common to common in riparian shrubland and adjacent valley mesquite. Early dates: 8 May 1959 (Silver City) and 30 April 1960 (Cliff).

\* **House Sparrow:** *Passer domesticus domesticus*. (SR)—Regular resident throughout the valley; uncommon and local; mainly nests near habitations but also constructs its globular nest in native habitats.

\* **Eastern Meadowlark:** *Sturnella magna lilianae*. (SR)—Occasional to irregular summer resident (resident?) in the Cliff and Redrock areas; rare to uncommon and local in grassland. Also bred in a riparian field near Cliff in June 1969 (D. A. Zimmerman).

\* **Western Meadowlark:** *Sturnella neglecta neglecta*. (PR)—Regular resident in the Cliff area and occasionally near Redrock; rare to fairly common in riparian fields. Also bred in grassland near Gila in June 1968 (US).

**Yellow-headed Blackbird:** *Xanthocephalus xanthocephalus*. Two summer records: two males near Redrock on 17 July 1959; three males and two females at Redrock Marsh on 27 June 1968. These were presumably early postbreeding migrants.



\* **Red-winged Blackbird:** *Agelaius phoeniceus fortis*. (RR)—Irregular to regular resident throughout the valley; uncommon to fairly common and local in summer, breeding in marshland and apparently other dense habitats near water.

**Orchard Oriole:** *Icterus spurius*. Casual near Cliff, where a male was seen on 27 June 1967 (R. A. Fisher).

\* **Hooded Oriole:** *Icterus cucullatus nelsoni*. (PR)—Regular summer resident throughout the valley, locally in the Cliff area north to Mogollon Creek; uncommon to fairly common in riparian woodland and valley mesquite. Early dates: 13 May 1959 and 8 May 1961 (Silver City area); 9 April 1960 (Cliff).

\* **Scott's Oriole:** *Icterus parisorum*. (NR)—Occasional to irregular summer resident in the Cliff and Redrock areas; rare to uncommon in grassland and shrubland containing soapweed (*Yucca elata*). Early dates: 9 April 1960 and 25 March 1961 (Cliff).

\* **Bullock's Oriole:** *Icterus bullockii bullockii*. (PR)—Regular summer resident throughout the valley; fairly common to common in riparian and adjacent woodlands. Early dates: 6 April 1959 and 22 April 1961 (Silver City); 9 April 1960 (Cliff).

\* **Boat-tailed Grackle:** *Quiscalus mexicanus*. (PR)—Bred at Buckhorn Marsh in 1968 and present there in the summers of 1967 (J. R. Fisher) and 1970 (R. A. Fisher); in 1968 at least 11 adults, eight fledglings, and five nests were found in the area. Also present near Cliff in the summer of 1970 (R. A. Fisher). The nearest breeding colonies to the study area previously known are at Lordsburg, New Mexico and Duncan, Arizona.

An adult female specimen (US) taken in June 1968 is intermediate in size and color between *C. m. monsoni* and *C. m. nelsoni*.

\* **Brown-headed Cowbird:** *Molothrus ater obscurus*. (SR)—Regular summer resident throughout the valley; uncommon to common in shrubby and wooded habitats. Early dates: 8 May 1958, 22 April 1959, and 15 March 1960 (Silver City area); 22 April 1961 (Cliff).

Nest hosts used by this cowbird include: Vermilion Flycatcher, male feeding fledgling cowbird (US) at Redrock on 13 June 1968; Lucy's Warbler, nest with one warbler egg, one warbler hatchling, and one cowbird egg near Cliff on 20 June 1968; Yellow-breasted Chat, nest with three chat eggs and two cowbird eggs near Cliff on 2 June 1967.

\* **Bronzed Cowbird:** *Molothrus aeneus loyei*. (PR)—Occasional to irregular summer resident in the Cliff and Redrock areas (perhaps now regular); rare to uncommon in riparian woodland and adjacent habitats. First recorded in the valley near Redrock, where one was seen on 6 June 1962 (J. L. Sands). By 1968 it had reached the southern Cliff area (US), and it was present in June and July of 1969 in the northern Cliff area, where it was found breeding at Mogollon Creek (D. A. Zimmerman).

**Western Tanager:** *Piranga ludoviciana*. Irregular in June and July throughout the valley, as a rare to fairly common migrant.

\* **Summer Tanager:** *Piranga rubra cooperi*. (RR)—Irregular to regular summer resident throughout the valley; uncommon to fairly common in riparian woodland. Early dates: 18 April 1959, 23 April 1960, and 22 April 1961 (Cliff).

\* **Cardinal:** *Cardinalis cardinalis superbus*. (PR)—Regular resident throughout the valley, more local in the northern Cliff area (north to Turkey Creek); rare to common in riparian shrubland and valley mesquite (seepwillow seems to be nearly essential for the occurrence of this species, although dense microphyll shrubland may also suffice).

This species was not recorded from the Gila Valley until 1908 (US), in spite of work there by Henshaw, Stephens, and Barrell in the period 1873 to 1890. This suggests that this conspicuous bird spread into the study area within this century. In the nearby San Francisco Valley, it was unrecorded by various workers as late as the 1920's (and probably 1939), but now occurs fairly commonly in the Glenwood area.

**Pyrrhuloxia:** *Cardinalis sinuatus sinuatus*. There is one definite record, a specimen taken near Gila on 22 February 1932 (R. T. Kellogg, CNH), plus several sight records; but the status of this species is unclear in the study area. It is probably an occasional to irregular, rare winter resident, although possibly resident.

\* **Black-headed Grosbeak:** *Pheucticus melanocephalus melanocephalus*. (PR)—Irregular to regular resident in the Cliff and Gila areas; uncommon in riparian and adjacent woodlands. Early dates: 30 April 1958, 22 April 1959, and 3 May 1961 (Silver City area); 23 April 1960 (near Cliff).

\* **Blue Grosbeak:** *Guiraca caerulea interfusa*. (PR)—Regular summer resident throughout the valley, fairly common to common in valley mesquite and adjacent shrubland, in weedy riparian fields, and at the edges of riparian woodland. Early dates: 9 May 1959 (Silver City) and 6 May 1960 (Mangas Springs).

\* **Indigo Bunting:** *Passerina cyanea*. (PR)—Irregular to regular summer resident; rare to uncommon and local in valley mesquite and adjacent shrubland, in weedy riparian fields, and at the edges of riparian woodland. First recorded in the valley near Cliff in July 1962 (WNM), where it has been regular since and definitely bred by June 1969 (D. A. Zimmerman). In summer of 1968 also present fairly commonly in the nearby San Francisco Valley, and a nest containing eggs was found at Pleasanton.

Specimens taken in 1963 (UM), as well as birds trapped for banding or examination, appear to be "pure" *P. cyanea* with no approach to *P. amoena*.

**Lazuli Bunting:** *Passerina amoena*. One summer record: an adult male, testes measuring 3 x 6 mm., taken at Gila on 8 July 1927 (R. T.

Kellogg, CNH). Probably a vagrant, although a singing male was present near Pleasanton in the nearby San Francisco Valley in June 1968 and a female was taken on 4 July (US).

\* **Brown Towhee:** *Pipilo fuscus mesoleucus*. (NR)—Occasional to irregular resident in the Cliff and Redrock areas; rare to fairly common and local in shrubby, nonriparian habitats. In winter occasionally occurs in riparian shrubland.

\* **Abert's Towhee:** *Pipilo aberti aberti*. (PR)—Regular resident in the Cliff (locally north to Mogollon Creek) and Redrock areas; irregular near Virden; rare to fairly common in riparian shrubland/woodland and adjacent valley mesquite (seepwillow or dense willow thickets seem to be essential for the occurrence of this species, although dense mesquite is also occupied).

This species is unknown in the nearby San Francisco Valley, although ecological conditions seem satisfactory for it.

**Lark Bunting:** *Calamospiza melanocorys*. Occasional to irregular in July in the Cliff and Redrock areas, as a rare to uncommon, postbreeding migrant.

\* **Lark Sparrow:** *Chondestes grammacus strigatus*. (NR)—Occasional to irregular summer resident throughout the valley; rare to fairly common and local in shrubby, nonriparian habitats. Early dates: 18 April 1959 and 23 April 1960 (Cliff); 16 April 1961 (near Silver City).

\* **Rufous-crowned Sparrow:** *Aimophila ruficeps scottii*. (NR)—Occasional to irregular resident in the Cliff and Redrock areas; rare to fairly common and local on slopes in grassy evergreen and adjacent microphyll shrublands.

**Cassin's Sparrow:** *Aimophila cassinii*. Occasional in summer in the Cliff and Redrock areas: at least 20 present in the area between Redrock and Lordsburg on 8 July 1963 (MVZ, UM) and several were noted on 25 July 1964; one was present near Cliff on 17 June 1968 and two were near Buckhorn on 3 July 1968. This species may breed locally, but at present there is no supporting evidence of this; summer birds may be early, postbreeding migrants.

\* **Black-throated Sparrow:** *Amphispiza bilineata deserticola*. (NR)—Regular resident throughout the valley; fairly common to common in shrubby, nonriparian habitats.

**Chipping Sparrow:** *Spizella passerina arizonae*. One summer record: grown juvenile taken at Mogollon Creek on 17 July 1957 (O. Milton, PM). This probably represents an early migrant rather than a locally hatched bird.

\* **Black-chinned Sparrow:** *Spizella atrogularis evura*. (NR)—Occasional to irregular summer resident (resident?) in the northern Cliff area. Early dates: 18 May 1958, 3 May 1959, 8 May 1960, and 6 May 1961 (Silver City area).

\* **House Finch:** *Carpodacus mexicanus frontalis*. (SR)—Regular resident throughout the valley; uncommon to common in shrubby and

wooded habitats, especially those containing cholla, soapweed, dense ornamental plantings, or habitations. Rarely breeds in riparian habitats, but on 15 June 1968 I found a pair at a nest in riparian woodland near Redrock.

\* **Lesser Goldfinch:** *Spinus psaltria hesperophilus*. (PR) —Irregular to regular summer resident throughout the valley; rare to fairly common in riparian and adjacent evergreen woodland. Juveniles were seen as early as 14 June 1968 near Redrock, while a female was seen at a nest near Cliff on 23 July 1959 (D. A. Zimmerman). Occasional in winter near Cliff and Redrock, where recorded several times in 1959–1960. Early dates: 8 March 1959 (Redrock); 12 March 1960 and 25 March 1961 (Cliff).

## DISCUSSION

To date, a total of 143 species of birds has been recorded in the Gila Valley in the height of the nesting season, which is centered on June and the first half of July. Of these 143 species, 31 are not thought to breed in the study area, whereas the other 112 definitely or probably have bred. Nonbreeders include several species which are only migrants in the area (e.g., Olive-sided Flycatcher, Audubon's Warbler, Wilson's Warbler, Western Tanager, and Lark Bunting), plus the unsuccessfully introduced Chukar and Black Francolin. Also included among the 31 are several species which may possibly breed but for which such evidence is lacking (e.g., Least bittern, Sharp-shinned Hawk, Ground Dove, Violet-green Swallow, Blue-gray Gnatcatcher, Solitary Vireo, Pyrrhuloxia, Cassin's Sparrow, and Chipping Sparrow).

### Regularity of Occurrence of Breeding Species

As in many breeding avifaunas, there is variation between species in the regularity of their occurrence from year to year and place to place in the Gila Valley. Among the 112 breeding species, seven occur so infrequently as to be termed casual in the area (i.e., Pied-billed Grebe, Black-crowned Night Heron, Blue-winged Teal, Gray Hawk, Costa's Hummingbird, Tree Swallow, and Plain Titmouse). Ten others occur somewhat more frequently and are termed occasional (i.e., Green Heron, Cinnamon Teal, Zone-tailed Hawk, Scaled Quail, Harlequin Quail, Sora, Common Crow, Common Bushtit, Bendire's Thrasher, and Gray Vireo). Together the casual and occasional groups comprise 15.2 per cent of the avifauna, while the remaining, more frequently occurring species comprise 84.8 per cent, or 95 species. Twenty-five of the latter species are occasional to irregular or are irregular (e.g., Common Merganser, American Coot, Band-tailed Pigeon, Barn Owl, Hairy Woodpecker, Crissal Thrasher, Eastern Meadowlark, and Black-chinned Sparrow), while the remaining 70 species are irregular to regular or are

regular (e.g., Great Blue Heron, Turkey Vulture, Sparrow Hawk, Gambel's Quail, Killdeer, Mourning Dove, Gila Woodpecker, Western and Cassin's Kingbirds, Vermilion Flycatcher, Bewick's Wren, Mockingbird, Lucy's Warbler, Cardinal, Blue Grosbeak, House Finch, and Abert's Towhee).

While this scale of the frequency of occurrence implies a certain predictability in being able to find a given species in the valley, it should be understood that many variables exist. For example, some species are very local, some vary in occurrence with changes in habitat availability, while others are easily overlooked or are apt to be confused with similar species. Also, the regularity of occurrence is based on somewhat limited information, and the actual status may be incorrectly assessed (or it may change). Nevertheless, the values recorded here are thought to be useful guidelines and a fair assessment of the parameter concerned.

### Habitat Utilization by Breeding Species

Habitats in the Gila Valley vary considerably and their utilization by breeding species varies as well. As indicated earlier, I have subdivided the breeding avifauna into four somewhat arbitrary categories, based on the use and apparent degree of dependency of given species on the range of available habitats. Viewed with an emphasis on the river and the habitats that it fosters, the most important categories of breeding birds are those which encompass the species that use primarily riparian habitats. These total 55 species, or 49.1 per cent of the breeding avifauna, and are subdivisible into two categories. The first category is *restricted riparian*, which consists of 28 species (25.0 per cent of the avifauna) that are essentially confined to riparian habitats in the breeding season (e.g., Great Blue Heron, Mallard, Common Merganser, Black Hawk, American Coot, Yellow-billed Cuckoo, Gila Woodpecker, Wied's Crested Flycatcher, Traill's Flycatcher, American Robin, Yellow Warbler, Red-winged Blackbird, and Summer Tanager). The second category is *primary riparian*, which consists of 27 species (24.1 per cent of the avifauna) that show a basic requirement for riparian habitats but that have varying degrees of usage of adjacent nonriparian habitats (e.g., Cooper's Hawk, Killdeer, White-winged Dove, Western Wood Pewee, Vermilion Flycatcher, Bell's Vireo, Lucy's Warbler, Bullock's and Hooded Orioles, Cardinal, Blue Grosbeak, and Abert's Towhee).

The restricted and primary riparian categories of birds constitute those species that would undoubtedly disappear from the study area in the absence of the river and its habitats. Such disappearance would variably affect the overall distribution of this segment of birds. For example, it would extirpate Abert's Towhee from New Mexico and seriously reduce the populations in the state of such species as the Black Hawk, Elf Owl, Gila Woodpecker, Wied's Crested Flycatcher,

Bell's Vireo, Lucy's Warbler, Bronzed Cowbird, and Cardinal. For such species as the Mexican Duck, White-winged Dove, Vermilion Flycatcher, Hooded Oriole, and Boat-tailed Grackle an important northern breeding locality would be lost, while a southern one would be lost for such species as the Mallard, Traill's Flycatcher, and Indigo Bunting. Lowland populations of such typically montane birds as the Red-shafted Flicker, Hairy Woodpecker, White-breasted Nuthatch, American Robin, and Black-headed Grosbeak would also disappear from the area. Obviously, an important segment of the birds breeding in the Gila Valley not only makes extensive use of riparian habitats, but depends on them for their survival in the area.

The remaining 57 species (50.9 per cent of the breeding avifauna) consist of birds that appear to be independent of the river and its habitats and would probably persist in the area even in the absence of such. This is not to say that riparian habitats are avoided, for the 25 species (22.3 per cent of the avifauna) in the *secondary riparian* category make some to extensive use of such habitats (e.g., Turkey Vulture, Swainson's Hawk, Great Horned Owl, Ash-throated Flycatcher, Mexican Jay, Bridled Titmouse, and Phainopepla). In fact, some secondary riparian species seem to reach their maximum abundance in riparian habitats (e.g., Mourning Dove, Western and Cassin's Kingbirds, Bewick's Wren, and Brown-headed Cowbird); for such species riparian habitats are important population centers. The final 32 species (28.6 per cent of the avifauna) are in the *nonriparian* category, which consists of birds that make little or no use of riparian habitats in the breeding season, except perhaps for drinking and bathing (e.g., Golden Eagle, Scaled Quail, Roadrunner, Horned Lark, Verdin, Mockingbird, Loggerhead Shrike, Brown Towhee, and Black-throated Sparrow). For nonriparian species the disappearance of the river and its habitats would probably be of minor importance, and populations in the area would probably be little affected.

### Biogeographic Affinities of the Breeding Species

The biogeographic affinities of the breeding avifauna are predominantly with North America, with 79 of the 109 native species (72.5 per cent of the avifauna) confined to the continent. Twenty-two other species (20.2 per cent) range into South America, while eight species (7.3 per cent) range into the Old World as breeders. Of the latter, five are holarctic (i.e., Mallard, Common Merganser, Golden Eagle, Barn Swallow, and Common Raven). The Black-crowned Night Heron and the Barn Owl are cosmopolitan; the Horned Lark is holarctic plus northern South America in its breeding distribution. Besides native birds, there are three Eurasian species that have been introduced into North America and that breed in the Gila Valley (i.e., Common Pheasant, Common Starling, and House Sparrow).

While not unexpectedly lacking endemics, the Gila Valley shares a number of such, or near endemics, with the Sonoran lowland region to the west. These include the narrowly endemic Abert's Towhee and the somewhat more widely distributed Bendire's Thrasher and Lucy's Warbler, both of the last two breeding eastward to the Rio Grande Valley of New Mexico (at least the warbler is a recent invader). Gambel's Quail is also a near endemic, ranging to the Rio Grande Valley and also southward into the Sinaloan lowland region of western Mexico. (Costa's Hummingbird might be considered a Sonoran near endemic as well.) These four (or five) species give the Gila Valley a Sonoran aspect, which is further heightened by certain subspecific affinities (e.g., *Centurus uropygialis uropygialis*, *Myiarchus tyrannulus magister*, *Vireo bellii arizonae*, *Molothrus aeneus loyei*, *Icterus cucullatus nelsoni*, and *Cardinalis cardinalis superbus*).

A relationship also exists with what might be termed the Madrean or Mexican Plateau region (e.g., Mexican Duck, Harlequin Quail, Mexican Jay, and Bridled Titmouse) and, not unexpectedly, with the arid and semiarid regions of western North America in general. Forty of the species breeding in the Gila Valley fall in the latter category, which constitutes 36.7 per cent of the breeding avifauna (44.9 per cent with the addition of Sonoran and Madrean species). Seventeen of these are relatively widespread (e.g., Swainson's Hawk, Common Poor-will, Bullock's Oriole, and House Finch), although one, Bell's Vireo, is at a northern distributional point in New Mexico in the Gila Valley. Eighteen species of the arid and semiarid western North American element are more southerly (e.g., Scaled Quail, Ladder-backed Woodpecker, Curve-billed Thrasher, and Brown Towhee), including several of which reach one of their northern distributional limits in New Mexico in or near the Gila Valley (e.g., Inca Dove, Elf Owl, Verdin, Phainopepla, Hooded Oriole, and Bronzed Cowbird).

The remaining species breeding in the Gila Valley generally lack narrow enough distributions to represent biotic provinces or regions, although there are perhaps a few exceptions. For example, the Indigo Bunting is a species typical of seral stages of the eastern broadleaf forest region of North America, and its occurrence as a breeding bird in the Southwest appears to be relatively recent. No such recency seems to pertain to the range of the Summer Tanager, which is typical of xeric forests in the southeastern United States and reappears in riparian woodlands of the Southwest and adjacent Mexico (*Piranga rubra rubra* breeding in the east, *P. r. cooperi* in the west).

Additional reference should be made to species for which the Gila Valley is at or near the distribution limits in the breeding season, because this indicates the blending of biotas there plus the valley's import as an area of avian occupancy. Of the 10 breeding species with primarily neotropical distributions, the Gila Valley is a northern point of occurrence in New Mexico for four (i.e., Gray Hawk, White-winged

Dove, Lesser Nighthawk, and Boat-tailed Grackle) and near such a point for the five others (i.e., Zone-tailed Hawk, Black Hawk, Wied's Crested Flycatcher, Black Phoebe, and Vermilion Flycatcher); the Lesser Goldfinch ranges northward considerably farther in western New Mexico. In addition, the valley is at or near a southern limit in the breeding range of several northern species (e.g., Mallard, Blue-winged Teal, Sora, Spotted Sandpiper, Traill's Flycatcher, Tree Swallow, Common Crow, and Indigo Bunting).

### Changes in the Breeding Avifauna in Historic Times

In spite of the scanty early record of the birdlife of the Gila Valley, certain changes in its composition have been detected or are suspected as having occurred in historic times. Perhaps the only species extirpated has been the Wild Turkey, signs of which were reported by Capt. A. R. Johnston along the river near the present town of Cliff in October 1846 (Emory, 1848). Assuming that this report is accurate and that the species does not occur in the Gila Box Canyon, the Wild Turkey would seem to have disappeared from the Gila Valley. There are other possible cases of extirpation, particularly among water birds, which may have left the area because of destruction of marshland and other aquatic habitats. For example, had suitable marshes existed, the American Bittern (*Botaurus lentiginosus*) may have occurred as a breeding bird in the Gila Valley, since it was reported as common in the summer of 1908 at nearby Mangas Springs (Bailey, 1928) where extensive marshes formerly existed (Emory, 1848).

More significant than possible extirpations have been the additions of species to the avifauna, at least based on the data presently available. Recent and definite newcomers as breeding birds in the Gila Valley are the Common Crow, Boat-tailed Grackle, Bronzed Cowbird, and Indigo Bunting, all probably within the last decade. Other species for which there is good evidence of arrival in historic times are the Gila Woodpecker and the Cardinal, both first detected in 1908, and Lucy's Warbler, which seems to have arrived in the late 1920's. In addition, the Inca Dove was established at Virden by 1947 (Ligon, 1961) and probably arrived there during the present century.

Much of the evidence of a recent invasion of the area by these and other species is negative, i.e., based on the failure of early workers to record them in the valley or its vicinity. In the case of conspicuous species, particularly those which are numerous at present, such evidence is probably valid. On the other hand, where a species is local, not numerous, and/or apt to be misidentified, the evidence is less secure. Thus, the lack of early records of such species as the Black Hawk may not actually reflect the absence of the bird.

Besides range extensions by native birds, there have also been incur-



sions by two Eurasian species into the Gila Valley, spreading westward from areas of introduction in the northeastern United States: the first is the House Sparrow, which apparently arrived early in this decade (Ligon, 1961), and the second is the Common Starling, which is first known to have bred in 1960. (The Common Pheasant was introduced directly into the valley, probably in the last 40 years.)

In most cases there is little evidence that suspected invasions of the Gila Valley by new breeding species have been triggered by such ecological factors as habitat changes. For example, the riparian woodland favored by the Gila Woodpecker and the shrublands inhabited by Lucy's Warbler and the Cardinal have long been features of the area. On the other hand, settlement and the building of habitations may account for the establishment of the Inca Dove in the valley, although these changes alone do not guarantee this event, as is evidenced by the species' general absence in southern New Mexico over a wide area seemingly suitable for it. Another species that may have responded to ecological change is the Western Meadowlark, although virtually nothing is known of its early status in the area. It is largely confined in the Gila Valley to riparian fields, into which it could have spread only after man's occupancy of the area. Other man-made or man-influenced changes have certainly affected the birdlife of the Gila Valley, although perhaps not to the point of allowing additional species to invade the area. A number of species have shifted, at least in part, to man-made structures for nesting (e.g., Say's and Black Phoebes, Barn and Cliff Swallows, and House Finch); others use pastures, fields, clearings, fences, communications lines, and other such habitats for nesting and/or foraging. No doubt also affecting the distribution and abundance of various species in the valley has been the spread of cacti, mesquite, and other shrubs because of overgrazing. Shrubland species (e.g., thrashers, Brown Towhee, and Black-throated Sparrow) have probably spread as a result, whereas grassland species (e.g., Horned Lark and Eastern Meadowlark) have probably contracted.

Although many of the man-induced habitat changes have probably been as beneficial as they have detrimental (except to marshland), the point will be reached where alteration of natural habitats will produce a decline in the diversity and perhaps abundance of species in the avifauna. Continued clearing of riparian woodland is perhaps the major threat, but all native habitats and the river itself are subject to alterations which will endanger not only the avifauna but the other elements of the biota as well. The perpetuation of this valley as a reservoir of diverse and interesting plants and animals is unquestionably justified. To do this, exploitation must be checked and extensive areas should be preserved for natural vegetation. Moreover, habitats should be restored, particularly riparian types and especially marshland.

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